What is claimed is:

1. A method for detection, identification and delineation of a structure in a volume from original data, the method comprising:

(a) performing background characterization in the original data to determine at least one background class in the original data;

(b) identifying an exemplar in the original data;

(c) identifying structures throughout the volume in accordance with the at least one background class determined in step (a) and the exemplar identified in step (b); and

(d) extracting quantitative information from the structures identified in step (c).

2. The method of claim 1, further comprising suppressing noise in the original data to produce noise suppressed data, and wherein steps (a) and (b) are performed using the noise suppressed data.

3. The method of claim 2, wherein the noise is suppressed using median filtering.

4. The method of claim 2, wherein the noise is suppressed using low-pass filtering.

5. The method of claim 1, wherein step (a) is performed with an adaptive Bayesian classifier.

6. The method of claim 1, wherein step (b) is performed through manual tracing.

7. The method of claim 1, wherein step (b) is performed through semi-automated tracing.

8. The method of claim 1, wherein step (b) is performed through statistical region growth.

9. The method of claim 1, wherein step (b) is performed through geometrically constrained region growth.

10. The method of claim 1, wherein step (c) is performed through directed clustering.

11. The method of claim 10, wherein:

the volume comprises at least one background class and at least one target class; and

the directed clustering comprises:

(i) calculating a statistical descriptor for each of the at least one background class and the at least one target class, the statistical descriptor being used to calculate a discriminant; and

(ii) assigning each voxel to a class for which the discriminant is a minimum.

12. The method of claim 11, wherein the directed clustering further comprises (iii) re-estimating background class statistics after step (ii).

13. The method of claim 12, wherein, in the directed clustering, steps (ii) and (iii) are performed iteratively until a stable solution is achieved.

14. The method of claim 1, wherein step (d) comprises outputting the quantitative information to a database.

15. The method of claim 1, wherein the volume comprises an area of interest in a living body, and the structure is an abnormal region in the area of interest in the living body.

16. A method for locating a target region in a volumetric image set, the image set comprising a plurality of voxels, each of the plurality of voxels to be assigned to at least one target class or at least one background class, the method comprising:

(a) calculating an initial target class statistical descriptor for the at least one target class;

(b) calculating an initial background statistical descriptor for the at least one background class;

(c) assigning a class to each of the plurality of voxels for which a discriminant calculated from a class statistical descriptor for the class is a minimum;

(d) reestimating a background statistical descriptor for the at least one background class; and

(e) locating the target region to include each of the voxels which have been assigned to the at least one target class.

17. The method of claim 16, wherein steps (c) and (d) are repeated until a stable solution is achieved, and then step (e) is performed.

18. A system for detection, identification and delineation of a structure in a volume from original data, the system comprising:

an input device for receiving a user input comprising the original data;

a processor, in communication with the input device, for:

(a) performing background characterization in the original data to determine at least one background class in the original data;

(b) identifying an exemplar in the original data;

(c) identifying structures throughout the volume in accordance with the at least one background class determined in step (a) and the exemplar identified in step (b); and

(d) extracting quantitative information from the structures identified in step (c); and

an output device, in communication with the processor, for outputting a result of step (d).

19. The system of claim 18, wherein the processor suppresses noise in the original data to produce noise suppressed data and performs steps (a) and (b) using the noise suppressed data.

20. The system of claim 19, wherein the processor suppresses the noise through median filtering.

21. The system of claim 19, wherein the processor suppresses the noise through low-pass filtering.

22. The system of claim 18, wherein the processor performs step (a) with an adaptive Bayesian classifier.

23. The system of claim 18, wherein the user input comprises a manual tracing of the exemplar, and wherein the processor performs step (b) by receiving the manual tracing from the input device.

24. The system of claim 18, wherein the processor performs step (b) through semi-automated tracing based on the user input.

25. The system of claim 18, wherein the processor performs step (b) through statistical region growth.

26. The system of claim 18, wherein the processor performs step (b) through geometrically constrained region growth.

27. The system of claim 18, wherein the processor performs step (c) through directed clustering.

28. The system of claim 27, wherein:

the volume comprises at least one background class and at least one target class; and

the processor performs the directed clustering by:

(i) calculating a statistical descriptor for each of the at least one background class and the at least one target class, the statistical descriptor being used to calculate a discriminant; and

(ii) assigning each voxel to a class for which the discriminant is a minimum.

29. The system of claim 28, wherein the processor performs the directed clustering further by further (iii) re-estimating background class statistics after step (ii).

30. The system of claim 29, wherein, in the directed clustering, the processor performs steps (ii) and (iii) iteratively until a stable solution is achieved.

31. The system of claim 18, wherein the output device comprises a database, and wherein step (d) comprises outputting the quantitative information to the database.

32. A system for locating a target region in a volumetric image set, the image set comprising a plurality of voxels, each of the plurality of voxels to be assigned to at least one target class or at least one background class, the system comprising:

an input device for receiving the volumetric image set; and

a processor, in communication with the input device, for:

(a) calculating an initial target class statistical descriptor for the at least one target class;

(b) calculating an initial background statistical descriptor for the at least one background class;

(c) assigning a class to each of the plurality of voxels for which a discriminant calculated from a class mean and a class covariance for the class is a minimum;

(d) reestimating a background statistical descriptor for the at least one background class; and

(e) locating the target region to include each of the voxels which have been assigned to the at least one target class.

33. The system of claim 32, wherein the processor repeats steps (c) and (d) until a stable solution is achieved and then performs step (e).